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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,040	08/04/2003	Akihiko Ishibashi	63979-030	4713
7590 06/17/2005 McDERMOTT, WILL & EMERY 600 13th Street, N.W. Washington, DC 20005-3096			EXAMINER LE, THAO P	
			ART UNIT 2818	PAPER NUMBER

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,040

Applicant(s)

ISHIBASHI ET AL.

Examiner

Thao P. Le

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
4a) Of the above claim(s) 9-15 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-8 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Preliminary Amendment

Preliminary Amendment filed on 12/02/2003 has been entered and made of record. In Preliminary Amendment, claim 1 has been amended.

Priority

Acknowledge is made of applicants' claim for foreign priority base on an application 2002-139609 filed in Japan on 05/15/2002.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on **12/02/2003** and made of record.
The references cited on the PTOL 1449 form have been considered.

Drawings

The drawings are objected to for the following reason:

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Figures 8-9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The specification is objected to for the following reason:

On pages 3-4, " $1 \times 10^9 \text{ cm}^{-2}$ " or " $1 \times 10^7 \text{ cm}^{-2}$ " are incorrect.

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Tsuda et al., JP 2001-000069 (IDS).

Regarding claim 1, AAPA discloses a LED comprising (See Figs. 8-9):

A first GaN based 42 semiconductor layer that has on top thereof a plurality of concave portions formed into a band-like shape with predetermined intervals therebetween, a second GaN based 43 layer formed on the first GaN based layer, a layered structure that is formed on the second GaN based layer and that comprises an n-type GaN based layer 44, an active layer 46, a p-type GaN layer 48, an n-type electrode 53 that is formed on the n-type GaN based layer on the portion where the layered structure is partially exposed, a p-type electrode 50 formed on the p-type base GaN layer wherein the p-type electrode serves as an emission detection surface. However, AAPA fails to disclose an air layer (the concave is not filled with any materials such as n-GaN layer 44) is formed in the concave portion.

Tsuda et al. discloses a LED similar to AAPA's and also discloses concave portions formed on the first GaN based layer and the concave portions are filled with air. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify AAPA in view of Tsuda et al. because the void 116 in Tsuda et al. structure would reduce threading dislocation density and yield high emission efficiency.

Regarding claim 2, Tsuda et al. discloses wherein the light emitted from the active layer reflects at the interface between the bottom surface of the second GaN based layer and the air layer.

Regarding claims 3-7, Tsuda et al. discloses light-shielding regions to which wiring is applied are formed on the p-type electrode and n-type electrode, and among the plurality of concave portions, the concave portions formed beneath emission detection surface (group A) have a width greater (or not less than 6 μm and not more than 20 μm) than the ones formed beneath the light-shielding regions (not less than 1 μm and not more than 6 μm).

Regarding claim 8, both AAPA and Tsuda et al. disclose wherein wire bonding is applied to the light-shielding regions (see Figs 8-9 of AAPA).

Tsuda et al., U.S. Patent No. 6335546 also discloses a LED similar to what recited in claim 1 having concave portions (voids/cavities 116) that are not covered by growth film GaN.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785.

The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, flowing script.

Thao P. Le

Examiner

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June 14, 2005.